

1. A field emission device comprising an emitter tip formed from and integral with an emitter layer, the emitter tip having a height and including a base and an apex, wherein said emitter tip has a substantially rectilinear profile between said base and said apex, said substantially rectilinear profile being defined by a tip arc length and a tip chord length, wherein the ratio of said arc length to said chord length is less than or equal to about 1.2:1.

2. A field emission device according to claim 1, wherein the ratio of said tip arc length to said tip chord length is less than or equal to about 1.1:1.

3. A field emission device according to claim 1, wherein the ratio of said tip arc length to said tip chord length is less than or equal to about 1.05:1.

4. A field emission device according to claim 1, wherein the ratio of said tip arc length to said tip chord length is less than or equal to about 1.01:1.

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5. A field emission device comprising:  
3 an emitter layer including an emitter tip that has a height and including a base  
4 and an apex, wherein said emitter tip has a rectilinear profile between said base and  
5 said apex that is defined by a tip arc length and a tip chord length, wherein the ratio  
6 of said arc length to said chord length is less than or equal to about 1.2:1;  
7 a substrate; and  
8 a cathode conductive layer disposed over said substrate, said emitter tip being  
9 disposed over said cathode conductive layer.

10 6. A field emission device according to Claim 5, further comprising:  
11 a conductive gate structure disposed over said cathode conductive layer;  
12 an aperture through said conductive gate structure, said emitter tip being  
13 exposed within said aperture; and  
14 an anode panel positioned over said conductive gate structure and said emitter  
15 tip.

16 7. A field emission device according to Claim 6, wherein said anode plane  
17 comprises:  
18 an anode conductive layer;  
19 a phospholuminescent panel for emitting light upon being excited by  
20 electrons; and  
21 a transparent panel.

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1        9. A field emission device comprising:  
2            a substrate;  
3            a cathode conductive layer disposed over said substrate; and  
4            an emitter tip integral with an emitter layer disposed over said cathode  
5            conductive layer and having a base, an apex, and a continuously concave exterior  
6            surface extending from the base to the apex.

7        10. A field emission device according to Claim 9, further comprising:  
8            a conductive gate structure disposed over said cathode conductive layer;  
9            an aperture through said conductive gate structure, said emitter tip being  
10          exposed within said aperture; and  
11          an anode panel positioned over said conductive gate structure and said emitter  
12          tip.

13        11. A field emission device according to Claim 10, wherein said anode panel  
14          comprises:  
15            an anode conductive layer;  
16            a phospholuminescent panel for emitting light upon being excited by  
17            electrons; and  
18            a transparent panel.

1           12. A field emission device comprising:  
2           a substrate;  
3           a cathode conductive layer disposed over said substrate; and  
4           an emitter tip projecting from and integral with an emitter layer disposed over  
5           said cathode conductive layer and having a base, an apex, and an exterior surface,  
6           said exterior surface having a substantially paraboloid vertical profile that extends  
7           from the base to the apex.

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9           3           13. A field emission device according to Claim 12, further comprising:  
10           a conductive gate structure disposed over said cathode conductive layer;  
11           an aperture through said conductive gate structure, said emitter tip being  
12           exposed within said aperture; and  
13           an anode panel positioned over said conductive gate structure and said emitter  
14           tip.

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16           14. A field emission device according to Claim 13, wherein said anode panel  
17           comprises:  
18           an anode conductive layer;  
19           a phospholuminescent panel for emitting light upon being excited by  
20           electrons; and  
21           a transparent panel.

*Sealby*

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3 15. A field emission device comprising:  
4 a substrate;  
5 a cathode conductive layer disposed over said substrate; and  
6 an emitter tip that is an integral portion of a single emitter layer disposed over  
7 said cathode conductive layer and having a base, an apex, and an exterior surface,  
8 said exterior surface having an ovoid profile that extends from the base to the apex.  
9  
10 16. A field emission device according to Claim 15, further comprising:  
11 a conductive gate structure disposed over said cathode conductive layer;  
12 an aperture through said conductive gate structure, said emitter tip being  
13 exposed within said aperture; and  
14 an anode panel positioned over said conductive gate structure and said emitter  
15 tip.  
16  
17 17. A field emission device according to Claim 16, wherein said anode panel  
18 comprises:  
19 an anode conductive layer;  
20 a phospholuminescent panel for emitting light upon being excited by  
21 electrons; and  
22 a transparent panel.  
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1      18. A field emission device comprising an emitter tip formed from an emitter  
2      layer, the emitter tip having a height and including a base and an apex, wherein said emitter  
3      tip is generally conical and has a substantially rectilinear profile between said base and said  
4      apex.

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6      19. A field emission device according to Claim 18, wherein said substantially  
7      rectilinear profile is defined by a tip arc length and a tip chord length, wherein the ratio of  
8      said arc length to said chord length is less than or equal to about 1.2:1.

1 20. A flat panel display device comprising:  
2 a substrate;  
3 a cathode conductive layer disposed over said substrate;  
4 an array of emitter tips formed as a part of an emitter layer disposed over said  
5 substrate, each of said emitter tips having a height and including a base and an apex,  
6 each of said emitter tips having an exterior surface, said exterior surface having a  
7 profile with a continuous shape that extends from the base to the apex, said  
8 continuous shape being selected from the group consisting of a concave shape, a  
9 substantially paraboloid shape, and an ovoid shape;  
10 a conductive gate structure disposed over said cathode conductive layer;  
11 an array of apertures formed through said conductive gate structure, each of  
12 said emitter tips being exposed through one of said apertures; and  
13 an anode panel for emitting light in response to electrons emitted from said  
14 array of emitter tips.